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PATENT

GROUP 210
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: ARTHUR JAMES EDWARDS and
MIHALY LAMOTH

EXAMINER:

SERIAL NO: 924,100

GROUP:

FILED: OCTOBER 28, 1986

CASE NO: AP-00732

ENTITLED: CHARGE PUMP VOLTAGE REGULATOR

Motorola, Inc.
Corporate Offices
1303 E. Algonquin Road
Schaumburg, IL 60196
February 19, 1987

INFORMATION DISCLOSURE STATEMENT

Honorable Commissioner of
Patents and Trademarks
Washington, DC 20231

Sir:

The references listed on the attached Form PTO-1449, copies attached hereto, have come to the attention of Applicants' Attorney in a novelty search conducted before filing this application.

Applicants' Attorney has reviewed these references, and although of the opinion that the claims of this application distinguish over all of them, believes that the Examiner should be aware of the results of the search before his examination of the application.

More specifically, with regard to the enclosed references, the Lamoth et al. and Sievers references each disclose a constant frequency voltage regulator corresponding to the voltage regulator 11 in Figure 1 of the present application. Neither of these utilizes a charge pump circuit to provide a turn on voltage in excess of the B+ at the control terminal of a power switching device connected in series with the field coil and between B+ and ground. The Motorola Semiconductor information sheets dealing with the XPC1500 and MPC1500 merely describe a general purpose power switch which includes, internal thereto, a high frequency

charge pump. While high frequency charge pumps were previously known and utilized in switching driver circuits, such as the Motorola MPC1500, prior voltage regulator circuits, as discussed in the Background of the Invention section of the present application, utilize large capacitors and the existing low switching frequency signal of the pulse width modulated output of the voltage regulator to provide an effective voltage doubler to obtain a larger-than-B+ control signal for the resultant switching device. Thus, there is no prior art suggestion that the effective charge pump frequency must be substantially higher than the voltage regulator output switching signal in order to obtain improved circuit performance as required in the claims of the present invention. In addition, the Motorola switch device MPC1500, and the other references including the systems described in the Background section of the present application, clearly do not contemplate providing both a first and third switch alternately actuated in accordance with the voltage regulator output signal wherein these switches correspond to the transistors 21 and 35 in Figure 1. This configuration, as recited in dependent claims 7 and 9, provides minimum battery current drain during conditions of no field current flow, and clearly this configuration is not suggested by any combination of the prior art references.

In compliance with the Applicants' duty of candor, it is acknowledged that the present invention was developed under a development contract with a customer of Motorola wherein the customer provided development funding to Motorola. However, it is maintained that sufficient experimental activity concerning the development of the present invention continued up to and through October 29 through October 31 of 1985 such that no U.S. on sale bar exists under 35 USC 102(b). The Examiner is requested to consider the following.

Enclosed are copies of a fax schematic diagram sent by inventor Jim Edwards on October 29, 1985 to inventor Mihaly Lamoth in Geneva, Switzerland. The notation on the front of the fax cover sheet indicates that an additional 20-volt clamp stage has just been added to the attached schematic circuit corresponding, in general, to Figure 1 of the present application. This additional stage increased the breakdown protection of the effective Zener diode 35A shown in Figure 1 of the schematic diagram. This indicates that at least as of

October 29, 1985, additional design modifications to the present invention were being implemented by the inventors. In addition, also enclosed is a copy of an October 31, 1985 fax, again from inventor Jim Edwards to inventor Mihaly Lamoth. The cover sheet clearly indicates that now an additional circuit modification has been implemented wherein this essentially comprises the addition of a transistor switch corresponding to the transistor 21 in Figure 1. The notes on this fax cover sheet clearly indicate that this modification was considered necessary by the inventor in order to reduce the quiescent current consumption of the present circuit and, therefore, make the present invention commercially feasible.

As noted above, the addition of transistor 21 is specifically recited in several of the dependent claims (7 and 9) in the present application wherein this transistor is referred to as the third switch device. However, the October 31, 1985 fax clearly indicates that at least as of that time continued development work was proceeding with regard to developing a commercially feasible product. Therefore, clearly this October 31, 1985 fax indicates that the inventors had not finished with the design of the present invention, and that prior to this date they had recognized that the design was not commercially suitable due to possible excess battery current drain. This is believed to be conclusive evidence that the inventors did not consider the present invention "complete" until at least subsequent to October 31, 1985.

The Examiner's attention is directed to Section 2125.01 of the MPEP which, when discussing the applicability of on sale bars under 102(b) indicates that in general the invention cannot be on sale until it has been reduced to practise. However, the MPEP also states that the better test is actually whether or not the invention is complete. The MPEP specifically recites that the test for completeness of an invention is basically a matter of evaluating the subjective intent of an inventor, as manifested by the objective factual circumstances surrounding the development of the invention. It is submitted that the October 29 and October 31, 1985 faxes enclosed herewith conclusively demonstrate that the inventors realized that at least until October 31, 1985 the invention was not complete since extensive design iterations were made continuously up until at least October 31, 1985. Thus, it is submitted that no on sale bar can possibly exist when

evidence conclusively illustrates that continuing development activity existed up through October 31, 1985 and when the present invention has a filing date of October 28, 1986.

The Examiner is respectfully requested to consider all of the above statements dealing with distinguishing the present invention over the prior art and the development activities which occurred prior to filing the present application. It is believed that none of the above bars the patentability of the present invention, and, therefore, the Examiner is respectfully requested to allow all of the present pending claims.

Respectfully submitted,

ARTHUR JAMES EDWARDS and
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